# South Lake Union Streetcar Project

# Preliminary Engineering Capital Cost Report

**April 13, 2005**

Prepared for:
The City of Seattle Department of Transportation

Prepared by:
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# 1. Purpose

The preliminary engineering capital cost estimate for the South Lake Union Streetcar Project provides an estimated project level cost based on the preliminary engineering and environmental documentation performed between September 2004 and March 2005. The total estimated project cost includes:

- Total Anticipated Construction Cost
- Streetcar Vehicles
- Preliminary Engineering and Environmental Documentation
- Final Design and Construction Engineering/Administration
- Inflation to early 2006

The Total Estimated Project Cost is included in Table 9-1 of this report. Details supporting the estimate are included in Appendix A of this report.

# 2. Project Description

The City of Seattle, in cooperation with the U.S Department of Transportation Federal Transit Administration (FTA), proposes to construct a new streetcar line to serve the downtown, Denny Triangle and South Lake Union areas of Seattle. This line would provide local transit service, connect to the regional transit system, accommodate economic development, and contribute to neighborhood vitality. The project elements and construction are discussed in detail in the *South Lake Union Streetcar Project Description Memo* (Parsons Brinckerhoff, March 2005).

The proposed South Lake Union Streetcar would begin in the vicinity of the intersection of Westlake Avenue and Olive Way/5$^{th}$ Avenue in downtown Seattle (see Figure 2-1). It would extend north through the Denny Triangle and South Lake Union neighborhoods and terminate in the vicinity of Fairview Avenue N. and Ward Street near the Fred Hutchinson Cancer Research Center. The line would connect these neighborhoods and destinations with the regional transit hub at Westlake Center, which will be a major connection point for light rail, buses and monorail. The length of the proposed streetcar line is approximately 1.3 miles in each direction (2.6 track miles total) and the tracks and stops would be constructed entirely within existing right-of-way. The streetcar would share the street with automobile traffic.

As shown in Figure 2-1, streetcar stops would typically be side-platform corner-curb bulbs located within the parking lane at the far side of an intersection. Two stops would be center platform configurations: one within Fairview Avenue N. at the Fred Hutchinson campus and one in the railbank north of Valley Street adjacent to South Lake Union Park.

Bi-directional, low-floor, single-car, articulated streetcars are proposed. They are typically 66 feet long, 11.5 feet high, and 8 feet wide and run on standard gauge tracks. The streetcar would be powered by an overhead electrical system similar to those used by streetcars in cities such as Tacoma, Washington and Portland, Oregon.

A maintenance facility at the southwest corner of Fairview Avenue N. and Valley Street is also planned as part of this project. The maintenance facility building would be approximately 100 x 70 feet. Yard storage tracks would also be provided. Daily vehicle maintenance and inspections and minor repairs would be completed at the facility.

In the typical construction method for the streetcar track system, the top 12 to 18 inches of pavement would be removed and replaced with rail-embedded reinforced concrete slabs within a trench approximately eight feet wide. This project would also involve upgrading the stormwater detention system, relocation of utilities, and installation of traction power substations.

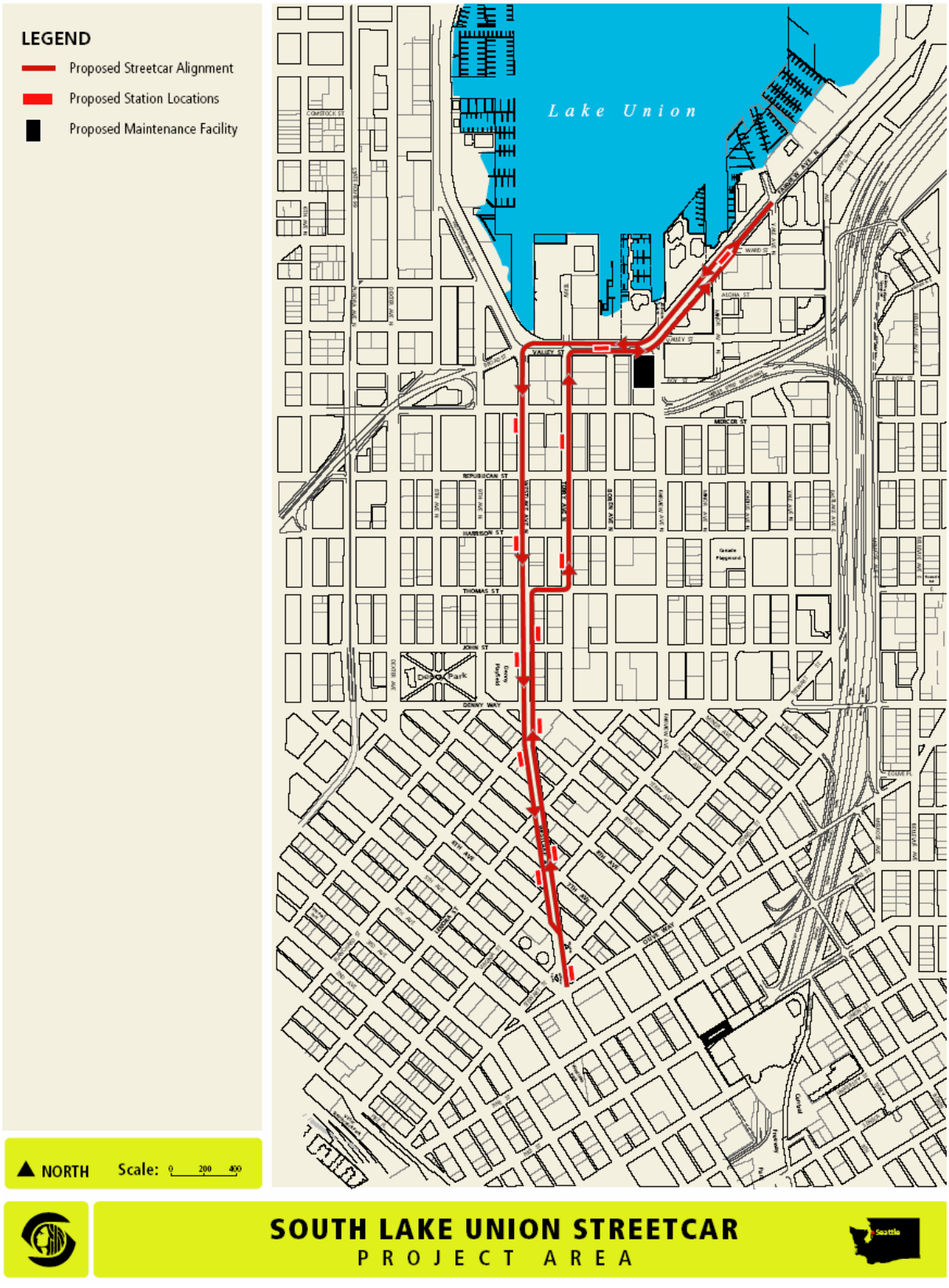


**Figure 2-1: Project Area**

# 3. Assumptions

Preliminary engineering estimates reflect the following general assumptions:

- A General Contractor/Construction Manager (GCCM) method of delivery is used in accordance with Chapter 39.10 of the Revised Code of Washington
- An adequate experienced labor pool is available at the time of construction
- Strikes that would impact labor or material delivery are not anticipated
- Normal Seattle area weather conditions will prevail during construction
- Agency reviews and permits are issued in a timely fashion
- Construction progress rates are consistent with those historically experienced on similar streetcar projects
- Traffic control will be similar to that required on similar projects in the downtown and South Lake Union area

# 4. Total Anticipated Construction Costs

The total anticipated construction cost is estimated in accordance with the scope defined in the Preliminary Engineering drawings dated March 28, 2005. Costs are based on quantity estimates and unit prices for each item identified in Appendix A. The major items included in the total anticipated construction cost are:

- Track construction
- Platforms and urban design
- Maintenance facility
- Seattle Public Utility facilities (water and sewer) impacted by the project
- Seattle City Light facilities (ductbanks and vaults) impacted by the project
- Stormwater detention and treatment facilities
- Roadway restorations and modifications
- Traffic signals, signs and striping
- Traction power substations
- Overhead Catenary system (streetcar vehicle power supply)
- Construction "soft costs" (mobilization, construction surveying, testing, QA/QC, fees, etc)
- Washington State Sales Tax

Unit prices used to develop the estimated construction costs include the following elements:

- Materials, labor, equipment (owned and rented), consumable supplies and subcontracts. Labor rates include all applicable burdens, such as Social Security and Medicare taxes (FICA), federal and state unemployment insurance (FUI/SUI), builders risk, builders liability, worker's compensation and union benefits.
- General conditions, administration (e.g., home and field overhead, mobilization, temporary facilities and controls, administration, subcontractor mark-up, etc.), and margin.
- Washington State and local sales tax for materials and supplies. No sales tax shall be included for labor and services, since it is assumed that the "Rule 171" tax exemption for infrastructure construction applies.

Since the design is at the preliminary engineering level of development (approximately 30% of completed design), contingencies are applied to the above elements. These contingencies account for the lack of complete design, uncertainties associated with the evolution of the design and potential changes in the construction market between the time of this estimate and the contract award date. As the design progresses, these contingencies will reduce as additional detail is included in the estimate. The individual contingencies vary due to the varying level of design detail associated with each element and are included in Appendix A.

# 5. Streetcar Vehicles

Streetcar vehicles are assumed to be procured from options included in the City of Portland's current agreement with the Inekon Group to provide streetcar vehicles to the City of Portland. The costs for the vehicles includes training, spare parts and Washington State Sales Tax.

# 6. Preliminary Engineering and Environmental Documentation

Preliminary engineering and environmental documentation costs incurred to date are included.

# 7. Final Design and Construction Engineering/Administration

Final design and construction engineering/administration are included as the city of Seattle's costs required complete design and administer construction. This is included as 17.5% of the total anticipated construction cost.

# 8. Inflation

All costs described above are in first quarter 2005 dollars. The total estimated project cost is stated in early 2006 dollars. An average inflation rate of 4% is used to adjust current costs to start of construction costs.

# 9. Total Estimated Project Cost

Table 9-1 summarizes the Total Estimated Project Cost. Estimate details for each item are included are included in Appendix A.

**TABLE 9-1**
SOUTH LAKE UNION STREETCAR
PRELIMINARY ENGINEERING COST ESTIMATE
SUMMARY SHEET

| ITEM | ESTIMATED BASE COST | CONTINGENCY % | CONTINGENCY AMOUNT | ESTIMATED COST |
|---|---|---|---|---|
| Construction Soft Costs* | $3,830,000 | 0% | $0 | $3,830,000 |
| Track Construction | $5,719,000 | 15% | $858,000 | $6,577,000 |
| Platforms & Urban Design | $651,000 | 25% | $163,000 | $814,000 |
| Maintenance Facility | $2,875,000 | 25% | $719,000 | $3,594,000 |
| Seattle Public Utilities: Water & Sewer | $1,955,000 | 25% | $489,000 | $2,444,000 |
| Seattle City Light: Ducts, Manholes, etc. | $2,104,000 | 15% | $316,000 | $2,420,000 |
| Stormwater Detention/Treatment | $565,000 | 30% | $170,000 | $735,000 |
| Roadway Restoration/Improvements | $1,581,000 | 30% | $474,000 | $2,055,000 |
| Traffic Signals and Striping | $1,440,000 | 25% | $360,000 | $1,800,000 |
| Traction Power Substations | $1,639,000 | 20% | $328,000 | $1,967,000 |
| Overhead Catenary System | $2,717,000 | 15% | $408,000 | $3,125,000 |
| Sub-Total Construction Costs | $25,076,000 | | $4,285,000 | $29,361,000 |
| WA State Sales Tax | | | | $899,000 |
| ***Total Anticipated Construction Cost*** | | | | ***$30,260,000*** |
| Streetcar Vehicles (3 vehicles incl WSST) | | | | $9,180,000 |
| Preliminary Engineering & Environ. Documentation | | | | $1,554,000 |
| Final Design, Construction & Engineering Administration | | | | $5,296,000 |
| **ESTIMATED PROJECT COST** | **1st Quarter 2005 Dollars** | | | **$46,290,000** |
| Inflation to early 2006 (start of construction) | 4% per year x 1 | | | $1,210,000 |
| **TOTAL ESTIMATED PROJECT COST** | **Early 2006 Dollars** | | | **$47,500,000** |

* Construction Soft Costs are estimated to be 15% of construction costs (total anticipated construction cost minus sales tax). The 15% is composed of:
- 8% mobilization
- 3.5% Construction Surveying, Health & Safety Plans and QA/QC
- 3.5% General Contractor/Construction Manager Fee

## APPENDIX A

| SOUTH LAKE UNION STREETCAR | | | | |
|---|---|---|---|---|
| PRELIMINARY ENGINEERING COST ESTIMATE | | | | |
| SUMMARY SHEET | | | | |
| | | | | |
| | | | | |
| ITEM | ESTIMATED | CONTINGENCY | | ESTIMATED |
| | BASE COST | % | AMOUNT | COST |
| Construction Soft Costs* | $3,830,000 | 0% | $0 | $3,830,000 |
| Track Construction | $5,719,000 | 15% | $858,000 | $6,577,000 |
| Platforms & Urban Design | $651,000 | 25% | $163,000 | $814,000 |
| Maintenance Facility | $2,875,000 | 25% | $719,000 | $3,594,000 |
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| Sub-Total Construction Costs | $25,076,000 | | $4,285,000 | $29,361,000 |
| WA State Sales Tax | | | | $899,000 |
| ***Total Anticipated Construction Cost*** | | | | ***$30,260,000*** |
| | | | | |
| Streetcar Vehicles (3 vehicles incl WSST) | | | | $9,180,000 |
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| Final Design, Construction & Engineering Administration | | | | $5,296,000 |
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| **ESTIMATED PROJECT COST** | **1st Quarter 2005 Dollars** | | | **$46,290,000** |
| Inflation to early 2006 (start of construction) | 4% | per year x | 1 | $1,210,000 |
| **TOTAL ESTIMATED PROJECT COST** | **Early 2006 Dollars** | | | **$47,500,000** |
| | | | | |
| | | | | |
| * Construction Soft Costs are estimated to be 15% of construction costs (total anticipated | | | | |
| construction cost minus sales tax). The 15% is composed of: | | | | |
| - 8% mobilization | | | | |
| - 3.5% Construction Surveying, Health & Safety Plans and QA/QC | | | | |
| - 3.5% General Contractor/Construction Manager Fee | | | | |

## APPENDIX A

SOUTH LAKE UNION STREETCAR
PRELIMINARY ENGINEERING COST ESTIMATE
TRACK CONSTRUCTION COSTS

| Item Description | Unit | Qty | Unit Price | Cost |
|---|---|---|---|---|
| Remove Pavement | SY | 13000 | $20 | $260,000 |
| Saw Asphalt Concrete, Full Depth | LF | 5000 | $3 | $15,000 |
| Saw Cement Concrete, Full Depth | LF | 18000 | $8 | $144,000 |
| Common Excavation | CY | 3500 | $30 | $105,000 |
| Unsuitable Foundation Excavation | CY | 400 | $30 | $12,000 |
| Construction Geotextile for Soil Stabilization | SY | 1200 | $5 | $6,000 |
| Mineral Aggregate, Type 2 | CY | 2040 | $50 | $102,000 |
| Purchase Ri52 Girder Rail | Mg | 460 | $1,850 | $851,000 |
| Purchase 25m Turnout | EA | 3 | $60,000 | $180,000 |
| Purchase #5 Turnout | EA | 3 | $30,000 | $90,000 |
| Install Paved Track | TF | 10730 | $250 | $2,682,500 |
| Install Paved Track in Curves < 400' Radius | TF | 1900 | $350 | $665,000 |
| Track Drain | EA | 3 | $10,000 | $30,000 |
| Install Ballasted Track | TF | 1050 | $220 | $231,000 |
| Install #5 Turnout (Ballasted) | EA | 3 | $50,000 | $150,000 |
| Install 25m Turnout | EA | 3 | $65,000 | $195,000 |
| **Sub-Total** | | | | **$5,718,500** |

SOUTH LAKE UNION STREETCAR
PRELIMINARY ENGINEERING COST ESTIMATE
PLATFORMS & URBAN DESIGN COSTS

| Item Description | Unit | Qty | Unit Price | Cost |
|---|---|---|---|---|
| New Scored Reinforced Concrete Platform | SF | 28080 | $5.00 | $140,400 |
| Landscaping | LS | 13 | $3,625.00 | $47,125 |
| S.S. leaning Rail | LF | 200 | $50.00 | $10,000 |
| Tactile Warning Strip (2'x42') | SF | 1260 | $25.00 | $31,500 |
| Trash Receptacle | EA | 13 | $500.00 | $6,500 |
| Structural Glass Rider Information panel | EA | 13 | $10,000.00 | $130,000 |
| LED "next streetcar arrives" display | EA | 15 | $4,000.00 | $60,000 |
| Canopies | LS | | | $225,000 |
| **Sub-Total** | | | | **$650,525** |
| | | | | |
| **Total Platforms & Urban Design** | | | | **$651,000** |

## APPENDIX A

| SOUTH LAKE UNION STREETCAR<br>PRELIMINARY ENGINEERING COST ESTIMATE<br>MAINTENANCE FACILITY COSTS | | | | |
|---|---|---|---|---|
| Item Description | Unit | Unit Price | Qty | Cost |
| Site Clearing/ Remove Exist. Pavement/ Slab on Grade & Disposal of Debris | SY | $12 | 3,733 | $44,800 |
| Demolition of existing buildings | SF | $4 | 30,000 | $120,000 |
| Grading Site - Cut & Fill 1' Average | CY | $10 | 1,200 | $12,000 |
| Silt Fence | LF | $3 | 760 | $2,280 |
| Asphalt Base Course 6" Thick | CY | $40 | 493 | $19,704 |
| Asphalt Pavement 4" Thick | SF | $1.60 | 26,600 | $42,560 |
| Signs | EA | $200 | 20 | $4,000 |
| Fence around Site | LF | $35 | 760 | $26,600 |
| Retaining Wall Along Fairview | SF | $15 | 480 | $7,200 |
| Site Utilities | LS | $200,000 | 1 | $200,000 |
| Site Lighting | EA | $5,000 | 10 | $50,000 |
| Embedded Track- Yard & Lead | TF | $260 | 900 | $234,000 |
| No.4 Turnouts in Existing Track | EA | $130,000 | 0 | $0 |
| No. 4 Turnouts | EA | $120,000 | 4 | $480,000 |
| No. 4 Equilateral | EA | $150,000 | 1 | $150,000 |
| Bumping Post | EA | $7,000 | 3 | $21,000 |
| Inspection PIT | LF | $1,500 | 65 | $97,500 |
| Interior Embedded Shop Track | TF | $300 | 200 | $60,000 |
| Inspection Platforms: 2 ea.- 10' Wide *(See Below)* | | | | |
| *Str. Steel Support - 15#/SF* | Ton | $3,200.00 | 10 | $31,200 |
| *Steel Grating & Framing* | SF | $35.00 | 1,170 | $40,950 |
| *Cast Iron `Tread 3'-6" wide and Pipe Rail for Platform* | RISER | $250.00 | 40 | $10,000 |
| *Platform Removable Guard Rail- Galvanized Steel* | LF | $120.00 | 130 | $15,600 |
| Portable Car Hoist System | EA | $180,000 | 1 | $180,000 |
| Overhead Contact System | LF | $160 | 1100 | $176,000 |
| Pre-engineered Building | SF | $90 | 7,000 | $630,000 |
| Bridge Crane 10 Ton | EA | $110,000 | 1 | $110,000 |
| Bridge Crane 15 Ton | EA | $130,000 | | $0 |
| Misc. Shop Equipment & Tools | LS | $100,000 | 1 | $100,000 |
| Furniture | LS | $10,000 | 1 | $10,000 |
| **Sub-Total** | | | | **$2,875,394** |
| | | | | |
| **Exclusions:** | | | | |
| Real Estate | | | | |
| Central Operating Control System | | | | |
| Train Control System | | | | |
| Traction Power Substation | | | | |

## APPENDIX A

SOUTH LAKE UNION STREETCAR
PRELIMINARY ENGINEERING COST ESTIMATE
SEATTLE PUBLIC UTILITIES & SEATTLE CITY LIGHT COSTS

| **Seattle Public Utilities Item Description** | Unit | Unit Price | Quantity | Cost |
|---|---|---|---|---|
| 12" Waterline Minor | LF | $250 | 395 | $98,750 |
| 8" Waterline Minor | LF | $250 | 1012 | $253,000 |
| Anode Test Stations - say $1000 each | EA | $1,000 | 33 | $33,000 |
| 42" Sewer Moderate | LF | $450 | 200 | $90,000 |
| 18" to 21" Sewer Minor | LF | $250 | 102 | $25,500 |
| Galer St Waterline Replacement | LS | | | $110,000 |
| Cased Mains & Services | LS | | | $1,345,000 |
| | | | | |
| **Seattle Public Utilities Total** | | | | **$1,955,250** |

| **Seattle City Light Item Description** | Unit | Unit Price | Quantity | Cost |
|---|---|---|---|---|
| Ductbank replacement, vault mods, etc. | LS | | | $2,104,000 |
| **Seattle City Light Total** | | | | **$2,104,000** |

**Notes:**
1. No costs are included for private utility relocations per franchise agreements
2. Costs stated are only for public utilities: SCL, SPU water, storm, sewer.
3. No costs are included or anticipated for King County Metro CSO facilities. Stormwater costs are included in "Stormwater Detention/Treatment" detailed cost sheet.
4. No costs are included in this estimate for relocating Metro overhead trolley bus facilities. Overhead contact system costs "Traction Power Substations and OCS" detailed cost sheet
5. SCL costs attributable to this project are assumed be incurred by SCL crews.
6. No costs are included for incidental traffic signal interconnect or street light conduits. Traffic signal modification costs are included in "Traffic Signals and Striping" detailed cost sheets
7. Costs reflect pavement replacement to limits of sawcut required only for trenching, to match existing.
8. No costs are included for pavement replacement to meet existing concrete pavement panel joints.

## APPENDIX A

SOUTH LAKE UNION STREETCAR
PRELIMINARY ENGINEERING COST ESTIMATE
STORMWATER DETENTION/TREATMENT COSTS

**STORMWATER WORK WITHIN RIGHT-OF WAY**

| Item Description | Qty | Unit | Unit Price | Cost |
|---|---|---|---|---|
| MAINTENANCE AND PROTECTION OF TRAFFIC CONTROL | 1 | LS | 80,000.00 | $80,000 |
| TRAFFIC CONTROL LABOR | 1500 | HR | 38.00 | $57,000 |
| TEMPORARY EROSION AND SEDIMENT CONTROL | 1 | LS | 25,000.00 | $25,000 |
| MOBILIZATION | 1 | LS | 0.00 | $0 |
| REMOVE PAVEMENT | 667 | SY | 15.00 | $10,005 |
| SAW CEMENT CONCRETE, FULL DEPTH | 2234 | LF | 8.00 | $17,872 |
| COMMON EXCAVATION | 2183 | CY | 20.00 | $43,660 |
| MINERAL AGGREGATE, TYPE 17 | 2822 | TN | 18.00 | $50,796 |
| PAVEMENT, ASPHALT CLASS A | 75 | TN | 125.00 | $9,375 |
| PAVEMENT BASE CONC CL 6.5 (1-1/2), 9 IN | 667 | SY | 52.00 | $34,684 |
| MANHOLE, TYPE 200A | 4 | EA | 2,800.00 | $11,200 |
| MANHOLE, TYPE 202A | 4 | EA | 6,000.00 | $24,000 |
| MANHOLE, TYPE 204A | 1 | EA | 12,000.00 | $12,000 |
| EXTRA DEPTH, TYPE 200A MANHOLE | 14 | VF | 200.00 | $2,800 |
| EXTRA DEPTH, TYPE 202A MANHOLE | 20 | VF | 250.00 | $5,000 |
| EXTRA DEPTH, TYPE 204A MANHOLE | 3 | VF | 500.00 | $1,500 |
| CATCH BASIN, TYPE 242B | 1 | EA | 1,600.00 | $1,600 |
| PIPE, CB CONN, CONC C14, CL 3, 8 IN | 340 | LF | 40.00 | $13,600 |
| FLOW CONTROL STRUCTURE, 72 IN | 4 | EA | 8,000.00 | $32,000 |
| FLOW CONTROL STRUCTURE, 96 IN | 1 | EA | 24,000.00 | $24,000 |
| PIPE, DETENTION, CONC REINF C76 CL III, 36 IN | 132 | LF | 200.00 | $26,400 |
| PIPE, DETENTION, CONC REINF C76 CL III, 48 IN | 284 | LF | 300.00 | $85,200 |
| PIPE, DETENTION, CONC REINF C76 CL III, 60 IN | 158 | LF | 550.00 | $86,900 |
| BEDDING, CL B, 8 IN PIPE | 340 | LF | 8.00 | $2,720 |
| BEDDING, CL B, 12 IN PIPE | 265 | LF | 10.00 | $2,650 |
| BEDDING, CL B, 36 IN PIPE | 132 | LF | 20.00 | $2,640 |
| BEDDING, CL B, 48 IN PIPE | 284 | LF | 26.00 | $7,384 |
| BEDDING, CL B, 60 IN PIPE | 158 | LF | 30.00 | $4,740 |
| PIPE, PSD, CONC REINF C76 CL V, 12 IN | 265 | LF | 50.00 | $13,250 |
| TEE, 12 IN CUT-IN EXISTING CONCRETE PIPE | 5 | EA | 850.00 | $4,250 |
| SAFETY SYST. FOR TRENCH EXCAVATION, MIN BID-$.40 PER SF | 2260 | SF | 1.50 | $3,390 |
| PIPE, SS OR SSS, PVC D3034 SDR 35, 6 IN | 155 | LF | 45.00 | $6,975 |
| **Sub-Total** | | | | **$ 702,591** |

**MAINTENANCE FACILITY**

| Item Description | Qty | Unit | Unit Price | Cost |
|---|---|---|---|---|
| COMMON EXCAVATION | 222 | CY | 20.00 | $ 4,440 |
| MINERAL AGGREGATE, TYPE 17 | 259 | TN | 18.00 | $ 4,662 |
| FLOW CONTROL STRUCTURE, 54 IN | 1 | EA | 6,000.00 | $ 6,000 |
| DETENTION VAULT 40' X10' X5' | 1 | 2 | 45,000.00 | $ 45,000 |
| PIPE, CB CONN, CONC C14, CL 3, 8 IN | 50 | LF | 40.00 | $ 2,000 |
| **Sub-Total** | | | | **$ 62,102** |
| ***Deduct PSDD 2 Detention Pipe and Appurtanances*** | | | | ***$200,000*** |
| **Total Estimated Base Cost** | | | | **$565,000** |

## APPENDIX A

SOUTH LAKE UNION STREETCAR
PRELIMINARY ENGINEERING COST ESTIMATE
ROADWAY RESTORATION/ IMPROVEMENTS COSTS

| Item Description | Qty | Unit | Unit Price | Cost |
|---|---|---|---|---|
| Temporary Traffic Control | 1 | LS | $950,000 | $950,000 |
| Erosion Control | 1 | LS | $40,000 | $40,000 |
| Remove, Abandon, or Relocate Structures and Obstructions | 1 | LS | $74,760 | $74,760 |
| Concrete Inlet, Type 250 or 252 | 9 | EA | $900 | $8,100 |
| Abandon Inlet | 9 | EA | $150 | $1,350 |
| Pipe, CB Connection, D.I., CL 50, 8-inch | 90 | LF | $45 | $4,050 |
| Surface Prep, Plane Bituminous Pavement | 20,056 | SY | $10 | $200,560 |
| Pavement, Asphalt Concrete, Cl. A (Qty. >=1000) | 2,044 | TN | $80 | $163,520 |
| Mineral Aggregate, Type 2 (6-inches) | 23 | CY | $42 | $966 |
| Cement Concrete Curbs and Gutter | 3,062 | LF | $16 | $48,992 |
| Cement Concrete Sidewalks (3.5-Inches) | 1,448 | SY | $36 | $52,128 |
| Driveway, Cement Concrete, HES, 8-inch | 178 | SY | $55 | $9,790 |
| Cement Concrete Curb Ramp 422a, Type 1 | 45 | EA | $350 | $15,750 |
| Seeded Lawn Installation (Qty. >= 10,000) | 26,315 | SF | $0.15 | $3,947 |
| Extra Depth, Type 204A Manhole | 14 | VF | $500 | $7,000 |
| **Sub-Total** | | | | **$1,580,913** |

SOUTH LAKE UNION STREETCAR
PRELIMINARY ENGINEERING COST ESTIMATE
TRAFFIC SIGNALS AND STRIPING COSTS

| Item Description | Unit | Qty | Unit Price | Cost |
|---|---|---|---|---|
| Traffic Signal - Westlake/Stewart | LS | 1 | $70,000 | $70,000 |
| Traffic Signal - Westlake/6th | LS | 1 | $70,000 | $70,000 |
| Traffic Signal - Westlake/Virginia | LS | 1 | $60,000 | $60,000 |
| Traffic Signal - Westlake/7th | LS | 1 | $60,000 | $60,000 |
| Traffic Signal - Westlake/Lenora | LS | 1 | $60,000 | $60,000 |
| Traffic Signal - Westlake/Blanchard | LS | 1 | $70,000 | $70,000 |
| Traffic Signal - Westlake/Denny | LS | 1 | $70,000 | $70,000 |
| Traffic Signal - Westlake/Mercer | LS | 1 | $70,000 | $70,000 |
| Traffic Signal - Westlake/Republican | LS | 1 | $70,000 | $70,000 |
| Traffic Signal - Westlake/Valley | LS | 1 | $150,000 | $150,000 |
| Traffic Signal - Terry/Valley Modif. | LS | 1 | $70,000 | $70,000 |
| Traffic Signal - Terry/Mercer | LS | 1 | $150,000 | $150,000 |
| Boren Que Splitter | LS | 1 | $70,000 | $70,000 |
| Traffic Signal - Valley/Fairview | LS | 1 | $150,000 | $150,000 |
| Traffic Signal - Fairview/Aloha | LS | 1 | $150,000 | $150,000 |
| Pedestrian Signal - Fairview/Ward | LS | 1 | $25,000 | $25,000 |
| Terminus Que Splitter | LS | 1 | $25,000 | $25,000 |
| Signing/Striping | LS | 1 | $50,000 | $50,000 |
| **Sub-Total** | | | | **$1,440,000** |

# APPENDIX A

SOUTH LAKE UNION STREETCAR
PRELIMINARY ENGINEERING COST ESTIMATE
TRACTION POWER SUBSTATIONS AND OCS COSTS

**Traction Power Substations**

| Item Description | Unit | Qty | Unit Price | Cost |
|---|---|---|---|---|
| Underground Substation Vault | EA | 2 | $66,000 | $132,000 |
| Underground Substation Supplied and Installed | EA | 2 | $350,000 | $700,000 |
| Maintenance Facility Substation Foundation | EA | 1 | $20,000 | $20,000 |
| Maintenance Facility Unitized Substation Supplied and Installed | EA | 1 | $450,000 | $450,000 |
| Substation Ground Mat | EA | 3 | $10,000 | $30,000 |
| Traction Power Ductbank, Raceways, Fittings | LF | 600 | $80 | $48,000 |
| Utility Manholes | EA | 2 | $25,000 | $50,000 |
| Traction Power Manholes, Fittings | EA | 3 | $7,500 | $22,500 |
| Traction Power Feeder Cable | LF | 2,400 | $15 | $36,000 |
| Substation Spare Parts | LS | 1 | $100,000 | $100,000 |
| Documentation, Manuals, Training | LS | 1 | $50,000 | $50,000 |
| **Sub-Total** | | | | **$1,638,500** |

**Overhead Catenary System**

| Item Description | Unit | Qty | Unit Price | Cost |
|---|---|---|---|---|
| OCS - Single Track (Foundation, pole, cantilever, wire, hardware) | LF | 10,100 | $217 | $2,191,700 |
| OCS - Double Track (Foundation, center pole, cantilever, wire, hardware) | LF | 1,700 | $250 | $425,000 |
| OCS Spare Parts | LS | 1 | $100,000 | $100,000 |
| **Sub-Total** | | | | **$2,716,700** |

SOUTH LAKE UNION STREETCAR
PRELIMINARY ENGINEERING COST ESTIMATE
STREETCAR VEHICLES COST

| Item Description | Unit | Unit Price | Qty | Cost |
|---|---|---|---|---|
| Vehicle Base Cost | EA | $2,565,473 | 3 | $7,696,419 |
| Trolley Pole Mods | EA | $125,000 | 0 | $0 |
| Spare Parts/Tools | LS | $640,000 | 1 | $640,000 |
| Operator Training | LS | $100,000 | 1 | $100,000 |
| WA Sales Tax | % | 8.80% | $8,436,419 | $742,405 |
| **Sub-Total** | | | | **$9,178,824** |